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MARY ELIZABETH BUSH
QUALLION LLC
P.O. BOX 923127
SYLMAR, CA 91392-3127

EXAMINER	
HODGE, ROBERT W	

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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/718,981
Filing Date: November 20, 2003
Appellant(s): TAN ET AL.

Travis Dodd
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/26/09 appealing from the Office action mailed 1/30/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

The amendment filed 10/26/09 (the same day as the filing of the brief) under 37 CFR 1.116(b)(1), canceling claims 34-47 has been entered with an Advisory Action – Paper No. 20091210.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The amendment filed 10/26/09 (the same day as the filing of the brief) under 37 CFR 1.116(b)(1), canceling claims 34-47 has been entered with an Advisory Action – Paper No. 20091210.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

A substantially correct copy of appealed claims 1-3, 5-23, 25-33, 74, 75 and 78 appears on pages 19-24 of the Appendix to the appellant's brief. The minor errors are as follows: The status identifiers show that claims 76 and 77 are "previously presented" on pages 23 and 24, when the status identifiers should show that claims 76 and 77 are "withdrawn".

(8) Evidence Relied Upon

5,147,739	Beard	9-1992
2002/0172862	Tamura et al.	11-2002
2002/0004169	Yamada et al.	1-2002
2003/0211383	Munshi et al.	11-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-3, 5-18, 74, 75 and 78 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in the instant specification for the negative limitation of a "non-zero concentration gradient" and appellants have not provided any direction in their remarks where support for said negative limitation can be found.

Claims 1-3, 5-10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,147,739 hereinafter Beard in view of U.S. Pre-Grant Publication No. 2002/0172862 hereinafter Tamura.

As seen in figure 1A, Beard teaches a primary battery (abstract) comprising a cathode 11 which does not contain lithium (Examples III-V in Table 1), an anode 12 having two separate layers disposed on the current collector, one layer 14 is a lithium metal active material layer and the other layer 15 is an intercalating compound which contains lithium (column 4, lines 28 et seq.) as an active material, an electrolyte solution which contains lithium in contact with the cathode and the anode (column 3, lines 47-53), wherein the layer 15 is positioned such that it protects the layer 14 from the electrolytic solution while allowing the electrochemical reaction to take place (column 4, line 53 – column 6, line 20).

Beard does not teach a non-zero concentration gradient in the second medium.

Tamura teaches that by providing a concentration gradient in an active material layer of a lithium battery, the reaction of the active material layer with the electrolyte is effectively suppressed and the cracking of the active material layer during discharge is controlled which prevents the separation of the layers (paragraphs [0011] and [0012]).

At the time of the invention it would have been obvious to one having ordinary skill in the art to provide a non-zero concentration gradient in the second medium layer of Beard as taught by Tamura in order to provide an active material layer wherein the reaction of the active material layer with the electrolyte is effectively suppressed and the cracking of the active material layer during discharge is controlled which prevents the

separation of the layers thus increasing the batteries efficiency. If a technique has been used to improve one device (providing a concentration gradient in an active material layer of a lithium battery), and a person of ordinary skill in the art would recognize it would improve similar devices in the same way (effectively suppressing the reaction of the active material layer with the electrolyte and controlling the cracking of the active material layer during discharge to prevent the separation of the layers), using the technique is obvious unless its actual application is beyond his or her skill. MPEP 2141 (III) Rationale C, KSR v. Teleflex (Supreme Court 2007).

Claims 11, 74 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beard in view of Tamura as applied to claim 1 above, and further in view of U.S. Pre-Grant Publication No. 2002/0004169 hereinafter Yamada.

Beard as modified by Tamura does not teach that the second active material includes lithium, silicon and oxygen such as LiSiO or SiO or that both LiSiO and SiO are present.

Yamada teaches a non-aqueous electrolyte lithium battery wherein the anode comprises at least two active materials including LiSiO and SiO in the intercalating layer of the anode (abstract and paragraphs [0046]-[0048]).

At the time of the invention it would have been obvious to one having ordinary skill in the art to use both LiSiO and SiO as the active materials for the intercalating layer in Beard as modified by Tamura as taught by Yamada in order to provide a lithium primary battery that has improved discharging characteristics that will prevent deterioration during discharging of the battery thus improving the overall performance of

the battery. Simple substitution of one known element (Yamada's active material) for another (Beards active material) would achieve the predictable result of providing a lithium primary battery that has improved discharging characteristics that will prevent deterioration during discharging of the battery thus improving the overall performance of the battery. MPEP 2141 (III) Rationale B, KSR v. Teleflex (Supreme Court 2007).

Claims 12, 13, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beard in view of Tamura as applied to claims 1 and 14 above, and further in view of U.S. Pre-Grant Publication No. 2003/0211383 hereinafter Munshi.

Beard as modified by Tamura does not teach that the cathode comprises a fluorinated carbon, or that the electrolyte comprises lithium bis(oxalate) borate.

Munshi teaches a primary lithium battery comprising a lithium or lithium alloy anode such as a lithium-silicon alloy, a cathode comprising a fluorinated carbon (i.e. CF_x) and a non-aqueous electrolyte comprising lithium bis(oxalate)borate (see paragraphs [0014], [0020], [0024], [0025] and [0028]).

At the time of the invention it would have been obvious to one having ordinary skill in the art to use CF_x for the cathode material and lithium bis(oxalate)borate in the electrolyte of Beard as modified by Tamura as taught by Munshi in order to provide a cathode that has increased kinetic properties and the ability to maintain excellent conductivity during discharge of the battery, which reduces the overall cell resistance and to provide an electrolyte that demonstrates excellent chemical and electrochemical stability when it is in contact with lithium, thus improving the over all performance of the battery. Simple substitution of one known element (Munshi's cathode material) for

another (Beard's cathode material) would achieve the predictable result of providing a lithium primary battery that has improved discharging characteristics that will prevent deterioration during discharging of the battery thus improving the overall performance of the battery. MPEP 2141 (III) Rationale B, KSR v. Teleflex (Supreme Court 2007). If a technique has been used to improve one device (providing lithium bis(oxalate)borate in the electrolyte of a battery), and a person of ordinary skill in the art would recognize it would improve similar devices in the same way (providing excellent chemical and electrochemical stability when it is in contact with lithium), using the technique is obvious unless its actual application is beyond his or her skill. MPEP 2141 (III) Rationale C, KSR v. Teleflex (Supreme Court 2007).

Claims 19-23, 25, 26, 29, 32, 33, are rejected under 35 U.S.C. 103(a) as being unpatentable over Beard in view of Yamada.

Beard as discussed above is incorporated herein.

Beard does not teach that the intercalating compound contains silicon, or that it includes lithium, silicon and oxygen such as LiSiO or SiO or that both LiSiO and SiO are present.

Yamada as discussed above is incorporated.

At the time of the invention it would have been obvious to one having ordinary skill in the art to use both LiSiO and SiO as the active materials for the intercalating layer in Beard as taught by Yamada in order to provide a lithium primary battery that has improved discharging characteristics that will prevent deterioration during discharging of the battery thus improving the overall performance of the battery. Simple

substitution of one known element (Yamada's active material) for another (Beards active material) would achieve the predictable result of providing a lithium primary battery that has improved discharging characteristics that will prevent deterioration during discharging of the battery thus improving the overall performance of the battery. MPEP 2141 (III) Rationale B, KSR v. Teleflex (Supreme Court 2007).

Claims 27, 28, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beard in view of Yamada as applied to claim 19 and 29 above, and further in view of Munshi.

Beard as modified by Yamada does not teach that the cathode comprises a fluorinated carbon, or that the electrolyte comprises lithium bis(oxalate) borate.

Munshi as discussed above is incorporated herein.

At the time of the invention it would have been obvious to one having ordinary skill in the art to use CF_x for the cathode material and lithium bis(oxalate)borate in the electrolyte of Beard as modified by Yamada as taught by Munshi in order to provide a cathode that has increased kinetic properties and the ability to maintain excellent conductivity during discharge of the battery, which reduces the overall cell resistance and to provide an electrolyte that demonstrates excellent chemical and electrochemical stability when it is in contact with lithium, thus improving the over all performance of the battery. Simple substitution of one known element (Munshi's cathode material) for another (Beard's cathode material) would achieve the predictable result of providing a lithium primary battery that has improved discharging characteristics that will prevent deterioration during discharging of the battery thus improving the overall performance of

the battery. MPEP 2141 (III) Rationale B, KSR v. Teleflex (Supreme Court 2007). If a technique has been used to improve one device (providing lithium bis(oxalate)borate in the electrolyte of a battery), and a person of ordinary skill in the art would recognize it would improve similar devices in the same way (providing excellent chemical and electrochemical stability when it is in contact with lithium), using the technique is obvious unless its actual application is beyond his or her skill. MPEP 2141 (III) Rationale C, KSR v. Teleflex (Supreme Court 2007).

Claim 78 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beard in view of Yamada as applied to claim 19 above, and further in view of Tamura.

Beard as modified by Yamada does not teach non-zero concentration gradients in the second medium.

Tamura as discussed above is incorporated herein.

At the time of the invention it would have been obvious to one having ordinary skill in the art to provide a non-zero concentration gradients in the second medium layer of Beard as modified by Yamada as taught by Tamura in order to provide an active material layer wherein the reaction of the active material layer with the electrolyte is effectively suppressed and the cracking of the active material layer during discharge is controlled which prevents the separation of the layers thus increasing the batteries efficiency. If a technique has been used to improve one device (providing a concentration gradient in an active material layer of a lithium battery), and a person of ordinary skill in the art would recognize it would improve similar devices in the same way (effectively suppressing the reaction of the active material layer with the electrolyte

and controlling the cracking of the active material layer during discharge to prevent the separation of the layers), using the technique is obvious unless its actual application is beyond his or her skill. MPEP 2141 (III) Rationale C, KSR v. Teleflex (Supreme Court 2007).

(10) Response to Argument

With regards to the 35 U.S.C. 112, first paragraph rejection, it is first noted that neither of the passages cited and quoted by appellants explicitly supports the negative limitation of a "non-zero concentration gradient" and no other explicit support can be found anywhere else in the instant disclosure. Furthermore there is not implicit support either; for example in the passage from paragraph 42 it states that "the second medium **can** be fabricated such that a gradient of the second active material extends across the width of the second medium" and "the concentration of the second active material **can** decrease in the direction of the arrow labeled G in Figure1A" and in the passage from paragraph 63 it states "converting the second active material precursor to the second active material **can** include forming a concentration gradient of the second active material" and "When the lithium and the SiO are contacted as shown in Figure 4, a LiSiO concentration gradient **can** be formed in the SiO". Just because a concentration gradient "can" be formed, does not mean that a concentration gradient "will" be formed. No where in either of the cited passages is there any positive statement that there will in fact be a concentration gradient in the active material layer. Further it is noted that both passages refer to figures of the instant application that supposedly illustrate this concentration gradient, however none of the figures referred to therein even remotely

show any sort of concentration gradient and in fact the figures alone show no concentration gradient at all, i.e. a zero concentration gradient. Therefore appellants' amendment filed 12/10/08 adding the negative limitation of a "non-zero concentration gradient" to the claims is New Matter and there is nothing in the instant disclosure to show that appellants had possession of the instantly claimed invention at the time of the invention.

With regards to the analogous art arguments regarding primary and secondary batteries. Appellants state that the difference between the two types of batteries is that secondary batteries are rechargeable and primary batteries are not rechargeable. Appellants further admit that there are many similarities between primary and secondary lithium batteries (Appeal Brief, page 10, first line of the third full paragraph). So what makes the two types of batteries different besides being rechargeable vs. non-rechargeable? The main difference is in a secondary battery both the anode and the cathode have intercalating materials that can easily release the lithium metal ions during discharge and charge respectively. Whereas in a primary battery the anode has an intercalating material that can easily release the lithium metal ions but the intercalating material of the cathode does not easily release the lithium metal ions if a potential is provided to charge the battery (however if enough potential is provided it will in fact release the lithium metal ions, which means it can be recharged). That being said neither independent claim 1 nor independent claim 19 even remotely describes any specific features of the cathode, both claims only require the presence of a cathode and then focus on the specifics of the anode. It is also noted that only the preambles of

independent claims 1 and 19 recite the limitation of "a primary battery" and there is no further limitation in the body of the claims that further limits the structure of the battery as being a primary battery. Furthermore the Primary reference used in the grounds of rejection to Beard teaches in the abstract as well as other locations in the reference that the anode of Beard is utilized in both **primary** and secondary batteries. Also Yamada teaches in paragraph [0065] that the embodiments of their invention may also be applied to a **primary** cell (i.e. battery) and Munshi teaches in paragraph [0001] that the present invention relates generally to **primary** lithium batteries. Further as evidence by the prior art references made of record it is quite clear that the active materials of the anode can be used in both primary and secondary batteries and therefore the combination of references in the grounds of rejections above is completely proper.

With regards to claim 1 appellants state that the secondary reference to Tamura must teach the concentration gradient in the active material in a second medium. Appellants should be aware that the grounds of rejection is not an anticipatory rejection, i.e. a rejection under 35 U.S.C. 102, the grounds of rejection is in fact an obviousness type rejection made under 35 U.S.C. 103(a). Furthermore as already stated the Tamura reference is the secondary reference which is used to show the advantages of providing a concentration gradient in an active material layer in a lithium battery. The advantage being, to provide an active material layer wherein the reaction of the active material layer with the electrolyte is effectively suppressed and the cracking of the active material during discharge is controlled which prevents the separation of the layers in the battery. This motivation comes directly from the Tamura reference in paragraph [0012].

No where in the grounds of rejection has any statement been made stating that any of the physical or chemical components of the battery of Tamura are being used to replace any of the physical or chemical components of Beard. The modification is a conceptual modification creating a concentration gradient in the active material of Beard for the advantages already described above, which was also reinforced with MPEP 2141 (III), Rationale C of the KSR v. Teleflex, Supreme Court Decision of 2007, to use of a known technique to improve similar devices (i.e. batteries) to obtain predictable results. Therefore it is submitted that a skilled artisan would still be motivated to provide a concentration gradient in Beard to achieve the predictable results as outlined by Tamura without changing any of the physical or chemical components of Beard.

With regards to claim 19, appellant again state that the secondary reference to Yamada must teach the second medium including SiO and the second active material including LiSiO. As was stated above the grounds of rejection is an obviousness rejection under 35 U.S.C. 103(a) not an anticipatory rejection. Furthermore the basis of the rejection is a simple substitution of one known element for another using MPEP 2141(III) Rationale B from the KSR v. Teleflex, Supreme Court decision of 2007 to obtain predictable results. Beard teaches two layers in the anode, one is a lithium metal and the other is an active material, a skilled artisan would understand that there is only one layer of Beard that can be substituted for when substituting active materials. That is only the active material layer can be substituted for with another active material layer. If the lithium metal layer of Beard were substituted for then the battery of Beard would not function, because there would be hardly any lithium present to react to give the

desired discharge of the battery. With regards to the motivation provided in the grounds or rejection appellants state that only the make-up of the positive electrode of Yamada will improve the discharge characteristics that will prevent deterioration during discharging of the battery and appellants provide supposed paragraphs where this supposed argument is substantiated. However in paragraph [0036] Yamada teaches that the advantages to the negative electrode during discharge are to prevent the dissolution of the negative current collector, i.e. preventing deterioration during discharge of the battery. Therefore a skilled artisan would in fact be motivated to make the modification as already outlined in the grounds of rejection above. Appellants further state that the teaching of SiO and LiSiO is very scarce. However it is quite clear in paragraph [0046] that SiO and LiSiO are both listed as active materials for a negative electrode and paragraph [0047] clearly states that two or more of the active materials listed in paragraph [0046] may be mixed to form the negative electrode active material. Appellants further state that there is no suggestion in Yamada to substitute the compounds in paragraph [0046] for the compounds in Beard. However the motivation has already clearly been addressed in the grounds of rejection above and also in response to appellants' arguments as clarified above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Robert Hodge/
Primary Examiner, Art Unit 1795

Conferees:

Basia Ridley

/Basia Ridley/
Supervisory Patent Examiner, Art Unit 1795

/Anthony McFarlane/